SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

PRELIMINARY DRAFT STAFF REPORT FOR PROPOSED AMENDED RULE 1113 – ARCHITECTURAL COATINGS

Dated: January, 2006

Deputy Executive Officer
Planning, Rule Development, and Area Sources
Elaine Chang, DrPH

Assistant Deputy Executive Officer
Planning, Rule Development, and Area Sources
Laki Tisopulos, Ph.D., P.E.

Planning and Rules Manager
VOC Rule Development
Larry M. Bowen, P.E.

Author:	Dan Russell	Air Quality Specialist
Reviewed by:	Lee Lockie	Director Area Sources
	Frances Keeler	Senior Deputy District Counsel
	Naveen Berry	Program Supervisor
Contributors	David De Boer	Senior Staff Specialist

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

GOVERNING BOARD

Chairman: WILLIAM A. BURKE, Ed.D.
Speaker of the Assembly Appointee

Vice Chairman: S. ROY WILSON, Ed.D.
Supervisor, Fourth District
Riverside County Representative

MEMBERS:

MICHAEL D. ANTONOVICH
Supervisor, Fifth District
Los Angeles County Representative

JANE W. CARNEY
Senate Rules Committee Appointee

BEATRICE J. S. LAPISTO-KIRTLEY
Mayor, City of Bradbury
Cities Representative, Los Angeles County/Eastern Region

RONALD O. LOVERIDGE
Mayor, City of Riverside
Cities Representative, Riverside County

GARY OVITT
Supervisor, Fourth District
San Bernardino County Representative

JAN PERRY
Councilmember, City of Los Angeles
Cities Representative, Los Angeles County, Western Region

MIGUEL PULIDO
Mayor, City of Santa Ana
Cities Representative, Orange County

JAMES W. SILVA
Supervisor, Second District
Orange County Representative

CYNTHIA VERDUGO-PERALTA
Governor's Appointee

DENNIS YATES
Council Member, City of Chino
Cities Representative, Cities of San Bernardino County

EXECUTIVE OFFICER:

BARRY R. WALLERSTEIN, D.Env.

TABLE OF CONTENTS

Page

ACRONYMS USED IN THIS REPORT

AQMD	South Coast Air Quality Management District
CA	California
CARB	California Air Quality Board
CEQA	California Environmental Quality Act
g/l	Grams per Liter
IM	Industrial Maintenance
MWD	Metropolitan Water District
NOx	Oxides of Nitrogen
NPCA	National Paint and Coatings Association
PAR	Proposed Amended Rule
SCM	Suggested Control Measure
TBAc	Tertiary-Butyl Acetate
tpd	Tons per day
tpy	Tons per year
U.S. EPA	United States Environmental Protection Agency
VOC	Volatile Organic Compound

EXECUTIVE SUMMARY

Rule 1113 - Architectural Coatings was originally adopted by the AQMD on September 2, 1977, to regulate the VOC emissions from the application of architectural coatings, and has since undergone numerous amendments. Future VOC limits for many coating categories are to take effect on July 1 of 2006, 2007 and 2008. The current rule contains a requirement for staff to conduct a technology assessment prior to implementation of the lower limits.

As a result of the comprehensive technology assessment, summarized in the 2005 Annual Status Report on Rule 1113 – Architectural Coatings[1], staff has developed the PAR 1113 to implement the recommendations from the report. Staff has considered public comment on the annual report in preparing the recommendation for amendments to Rule 1113.

The proposed amendments will allow the coating manufacturers to use TBAc as an exempt solvent in IM Coatings including zinc-rich primers, and establish a new high gloss nonflat category and postpone the 50 g/l final limit by one year to July 1, 2007 for the high gloss nonflat and quick-dry enamel category. In addition, the proposed amendments will tighten the VOC limit for the following five coating categories: bond breakers, concrete-curing compounds, dry-fog coatings, fire-retardant coatings, and traffic coatings by July 1, 2007. Most of these specific categories were identified by staff and NPCA as potential cost-effective means of offsetting the VOC emissions foregone due to the delay in implementation of the nonflat high gloss and quick-dry enamel categories.

The proposed amendments to Rule 1113 will be reviewed pursuant to CEQA and a Draft Environmental Assessment will be prepared for consideration with the adoption of PAR 1113. A socioeconomic assessment is being prepared and will be available 30 days prior to the Board Public Hearing.

BACKGROUND

Architectural coatings including IM coatings are one of the largest non-mobile sources of VOC emissions in the AQMD. Rule 1113 is applicable to manufacturers, distributors, and end-users of architectural coatings. These coatings are used to enhance the appearance of and to protect homes, office buildings, factories and other structures, and their appurtenances on a variety of substrates. The coatings may be applied primarily by brush, roller, or spray gun; and those applying these coatings include homeowners, paint contractors, or maintenance personnel. Aerosol coatings are regulated by CARB and are therefore exempt from this rule.

The 2003 Air Quality Management Plan shows the VOC emissions from the use of architectural coatings in 1997 at 50.9 tpd on an Annual Average Inventory, and 60 tpd on the Summer Planning Inventory. The emissions for 2006 and 2010 are projected at 32.7 tpd and 24 tpd respectively on the Annual Average Inventory, and at 38.5 tpd and 28.3 tpd on the Summer Planning Inventory. The latest CARB architectural coating survey for year 2000 sales, shows more than 50 tons per day of VOCs are attributed to the application of architectural coatings in the AQMD based on demographics.

[1] Presented to the Governing Board at their January 6, meeting.

VOC emissions cause the formation of ozone, $PM_{2.5}$ (particulate matter less than 2.5 microns in size) and PM_{10} (particulate matter less than 10 microns in size); three pollutants that exceed the state and national ambient air quality standards. They are the most serious regional air quality problem within this air Basin and the most difficult to reduce to healthful levels.

VOCs react photochemically with NOx to form ozone. Ozone is a strong oxidizer that irritates the human respiratory system and damages plant life and property. VOCs also react in the atmosphere to form $PM_{2.5}$ and PM_{10}, pollutants that adversely affect human health and limit visibility. Because these small particulates penetrate into the deepest regions of the lung, they affect pulmonary function and have been linked to an increased number of deaths.

Rule 1113 was first adopted in 1977, and has since undergone numerous amendments. When Rule 1113 was amended on November 8, 1996 it included an averaging compliance option (ACO) for complying with coating VOC limits. Under an ACO, manufacturers are allowed to average their emissions over a compliance period not to exceed one year provided they demonstrate their actual cumulative emissions from the averaged coatings are less than or equal to the cumulative emissions that would have been allowed under the VOC limits specified in the Table of Standards. That version of Rule 1113 offered the averaging option for the flat coating category only. Further amendments to Rule 1113 on December 6, 2002 and December 5, 2003, added numerous other coating categories to provide manufacturers additional compliance flexibility with the future VOC limits specified in the Table of Standards. The 2004 amendments addressed U.S. EPA concerns regarding the approvability of the ACO for the State Implementation Plan and the administration of the ACO Program.

Other alternative means of compliance are offered by the rule including the three-year sell-through provision and the small container exemption. Judging by the fact that many manufacturers utilize these provisions, staff has concluded that these flexibilities have allowed manufacturers additional time for product reformulation.

CARB developed a revised SCM for architectural coatings in June 2000, that was largely based on the interim limits and the averaging provision of Rule 1113, as amended in May 1999. The provisions in the SCM were developed by a consortium of California air pollution control districts, CARB, U.S. EPA Region IX, and paint manufacturers.

During the course of Rule 1113 development, the AQMD Governing Board approved a workplan that requires staff to submit an annual status report summarizing issues and activities regarding the implementation of the rule. In addition, the rule requires technology assessments for specific coating categories. In preparing the annual status reports, staff has received input from the technical Advisory Committee made up of individuals from manufacturing companies, NPCA, CARB, a consulting and engineering firm, a painting contractor and several members from academia. The 2006 annual status reports and technology assessments completed to date indicate that great progress has been made toward developing future compliant products in practically all categories. Staff is proposing a limited amendment to Rule 1113 to provide additional time and flexibility for a few coating categories that many manufacturers found the transition to the new limits most challenging. Specifically, staff is recommending the creation of a new high gloss nonflat category and postponement of the final limit of 50 g/l for nonflat high gloss and quick-dry enamels by one year. Staff is also recommending a limited exemption of TBAc from the VOC definition for industrial maintenance and zinc-rich primers. In an effort to affect the emission impact of the proposal,

staff is recommending tightening the VOC limits of certain other categories. The technology assessment and staff proposal are included in more detail in the subsequent sections of this rule.

In 2005 at Chairman Dr. William Burke's request, the Governing Board established an Adhoc Committee for the purpose of providing an open forum to discuss key regulatory issues relative to the coatings industry and improving communication between the AQMD and the architectural coating industry to resolve current and future regulatory issues in a non-litigious manner. During the discussions, NPCA acknowledged the air quality challenges of the region and expressed their desire to submit an alternate proposal that would be emissions neutral. An alternate proposal submitted by NPCA to amend Rule 1113 that expands the number of coating categories, maintains the current limits and deletes the future effective limits for those categories and advances the future limit for a portion of the flat coatings category. Staff believes, if adopted, the alternate proposal will result in significant foregone emission reductions from the current Rule 1113. This alternate NPCA proposal is discussed under the section *Proposed Amendments* of this report.

TECHNOLOGY ASSESSMENT

Rule 1113 requires staff to conduct a technology assessment for future VOC limits. In addition, the rule requires staff to consider any applicable future CARB architectural coating surveys. After the technology assessment a report to the AQMD Board is required on the appropriateness of the future VOC limits.

Highlights of the Annual Status Report on Rule 1113

IM Coatings

The IM coating category continues to be part of every study conducted by the AQMD and is considered to be the most challenging. Results of past studies indicate that coatings meeting the future limit of 100 g/l are currently available for the industrial maintenance coating category. Staff continues to obtain additional information on IM coatings from technical data sheet and material safety data sheet analysis. Included in that analysis are over 280 Industrial Maintenance Coatings (more than triple the number reported in the 2003 annual report to the Board) that are well below the July 1, 2006 100 g/l VOC limit.

Various public service agencies have completed testing of low-VOC products in recent years and have found compliant products with acceptable performance. For example, SCAP conducted its own independent evaluation of IM coatings. Southern California Alliance Of Publicly Owned Treatment Works is a non-profit corporation organized to help ensure that regulations affecting Publicly Owned Treatment Works are reasonable and in the publics best interest. Their testing of IM coatings was conducted to identify low-VOC coating systems suitable for wastewater treatment and conveyance facilities. Participants in this study included the Los Angeles County Sanitation District, the Orange County Sanitation District, the Eastern Municipal Water District, Las Virgenes Municipal Water District and the City of Los Angeles.

Southern California Alliance Of Publicly Owned Treatment Works evaluation of the performance of low-VOC atmospheric and immersion coating systems, completed in February 2003, indicated that compliant coating systems meeting the performance criteria for

wastewater environments and the 2006 limits in Rule 1113, performed similarly to existing coating systems.

MWD initiated its own independent evaluation which is ongoing to test new products that meet their very stringent internal standards for performance and that also meet the future VOC limit of 100 g/l. As mentioned in previous annual reports, a committee was formed in September 1999 comprised of representatives from the Los Angeles Department of Water and Power, the Department of Water Resources, the California Department of Transportation, and the MWD of Southern California. The committee, referred to as the "Essential Public Service Agencies", was initially tasked with identifying and testing low-VOC products and continues with the program today, through MWDs leadership.

Typical IM coatings are expected to have a 7 year longevity, whereas under their more stringent criteria, MWD desires an IM coating to last at least 15 years. MWDs list of approved IM coatings that meet their stringent standards is utilized by the Essential Public Service Agencies. The testing to date indicates that:

Available low-VOC industrial maintenance **immersion** coatings meeting the 2006 limits, conform to their stringent standards, and

They continue to look for IM coating **atmospheric** products that also meet their stringent criteria.

MWD has completed testing of some atmospheric IM coatings formulated with exempt solvents, including TBAc, a solvent that EPA and CARB has determined to be VOC exempt, that they are extremely optimistic about. AQMD staff agrees that TBAc has low photochemical reactivity and understands that TBAc is a desirable solvent from the formulator's standpoint. Many IM coating manufacturers are seeking delisting of TBAc for use in coatings critical to the support of the public infrastructure. Staff's preliminary analysis of the limited information on TBAc's toxicity indicates the potential health impacts from this solvent under limited use are low and could be recommended for a limited exemption for use in certain IM coating and zinc-rich primer applications.

Nonflat Coatings

Rule 1113 – Architectural Coatings defines nonflat coatings as registering a gloss of 5 or greater on a 60-degree meter and a gloss of 15 or greater on an 85-degree meter. The rule does not delineate various gloss ranges into distinct categories such as high, medium or low gloss.

There have been comments received from some manufacturers that a high gloss category should be developed in Rule 1113, similar to the 2000 CARB SCM for Architectural Coatings. In the SCM, high gloss coatings are those that register a gloss of 70 or above on a 60-degree meter and are allowed a higher VOC limit of 250 grams per liter. Although Appendix A of the Annual Status Report lists several high gloss coatings that are currently available and are below the 50 g/l limit that will be in effect in July 2006, several coating manufacturers commented to staff that the expected performance for certain key characteristics such as dirt pickup, may not be high enough. This issue, which is due to the softer resin technology used for 50 g/l products in the high gloss nonflat and the companion quick-dry enamel category, was last brought to staff's attention within the past year. As a result, this technology assessment focused on more carefully evaluating this criteria. Subsequent discussions with other manufacturers, however, indicated that with the latest resin and additive technologies, they

were able to overcome the dirt pick up issue. Discussions with raw material suppliers also reinforced the point of view that new resins that were recently made commercially available to the market will address these issues. Based on the state of technology, it appears that it is reasonable to expect that all manufacturers will be able to soon produce good performing products.

Despite this expressed concern with nonflat high gloss coatings, overall, the list of currently available super-compliant nonflats continues to grow as indicated by staff reviews and updates of information based on technical data sheets and material safety data sheets. There are currently over 50 coatings below 10 g/l (super-compliant) and a total of over 80 coatings below 50 g/l listed in Appendix A of the Annual Status Report. This is more than double the number of coatings listed in the report to the Board in December of 2003, indicating an increasing number of available compliant products. Consumers in the Do-It-Yourself (DIY) market purchase these compliant products for their personal use in and around their homes on a daily basis.

In spite of the increase in the availability of coatings in this category below 50 g/l, the rule still incorporates alternative compliance options, such as the averaging provision and an allowable three-year sell through provision for coating manufacturers to take advantage of. However, since staff's research to date has found few low-VOC products meeting the definition of high gloss, and in light of recent test results, AQMD staff is supportive of creating a new category specifically for nonflat high gloss effective July 1, 2006 with a VOC of 150 g/l, reducing to 50 g/l VOC by July 1, 2007. This additional time would allow manufacturers to incorporate the latest resin technologies. In addition, this would also include giving the same time extension and VOC limit of 150 g/l for the companion category of quick-dry enamels (discussed below) which are also high gloss. AQMD staff is committed to continuing further research in this area and remains open to further discussions on the issue with the TAC, and the possibility of conducting additional testing for nonflat high gloss coatings.

Quick-Dry Enamels (QDE)

A subcategory of nonflats, QDEs have gloss values greater than 70 on a 60º meter and should be capable of achieving set-to-touch in at least two hours, dry-hard in at least eight hours and be tack-free in at least four hours. AQMD staff recognizes that the same problems associated with dirt pickup for nonflat high gloss coatings exist with the QDEs, and is recommending the same interim limits.

Coating Categories Selected for Reduced VOC Limits

Bond Breakers

Bond breakers are coatings applied between layers of concrete to prevent the freshly poured top layer of concrete from bonding to the substrate over which it is poured. The primary use for this type of coating is in site-cast tilt-up concrete construction. Different types of resins are used in the formulations such as Oleoresinous binders, paraffin wax, polybutene and other polymer emulsions, acrylics and hydrocarbon. Most are chemically active meaning that they bond with the calcium in the fresh cement paste. The VOC limit for this category is currently 350 g/l and is proposed to be reduced to 100 g/l effective July 1, 2007.

Concrete-Curing Compounds

Concrete-curing compounds are coatings applied to freshly poured concrete to retard the evaporation of water promoting the optimum cement hydration immediately after placement. As cement hydrates, strength increases and permeability decreases. When hydration stops, strength gain ceases. Resins include acrylic, acrylic copolymer, alkyd, phenolic, calcium nitrate, hydrocarbon, lignosulfonate, siliconate, sodium silicate, wax, styrene acrylate, and polystyrene. The VOC limit for this category is currently 350 g/l and is proposed to be reduced to 100 g/l effective July 1, 2007.

Dry-Fog Coatings

Dry-fog coatings are applied by spray application only so that the overspray droplets dry before falling on floors and other surfaces. Resins include acrylic, acrylic copolymer, alkyd amines epoxy, vinyl toluene, and vinyl acrylic copolymer. The VOC limit for this category is currently 400 g/l and is proposed to be reduced to 100 g/l effective July 1, 2007.

Fire-Retardant Coatings

Fire-retardant coatings retard ignition and flame spread. The coating has to be fire tested and rated by a testing agency approved by building code officials for use in bringing building and construction materials into compliance with federal, state, and local building code requirements. The fire-retardant coating and the testing agency must be approved by building code officials. The coating must be tested in accordance with ASTM Test Method E-89 or listed by Underwriter's Laboratories, Inc. as a fire-retardant coating with a flame spread index of less than 25. Resins include acrylic, acrylic copolymer amines, poly vinyl acetate, urethane, polyurethane, and vinyl acrylic copolymer. The VOC limits for this category are currently divided into clear coatings at 650 g/l and pigmented coatings at 350 g/l with both proposed to be reduced to 50 g/l effective July 1, 2007.

Traffic Coatings

Traffic coatings are applied to public streets, highways, and other surfaces such as curbs, berms, driveways, and parking lots. Resins include acrylic, acrylic copolymer, alkyd, oleoresin, vinyl toluene, and vinyl acrylic copolymer. The VOC limit for this category is currently 150 g/l and is proposed to be reduced to 100 g/l effective July 1, 2007.

Market Penetration

The five coating categories selected for feasible lower VOC limits were derived from staff's comprehensive technology assessment and a list submitted by the NPCA. Staff reviewed these categories based upon availability and their potential for emission reductions. Staff evaluated the results of the CARB 2001 Architectural Coating Surveys (2001 Survey) for sales volume, emission inventories, and market penetration for those coatings meeting the proposed limits, and will evaluate the CARB 2004 Survey, should it become available before rule adoption. A preliminary evaluation of the emission inventory and available VOC technology for these five categories strongly indicates potential significant cost-effective emission reductions.

To better understand how significant the impact of the proposed amendments would be on the manufacturers, staff compiled Table 1 below, showing the market penetration of coatings already compliant with the proposed VOC limits, based on the data from the 2001 Survey. Since the survey was taken in 2000, additional low VOC products that have been developed and marketed are not reflected in these results. Therefore the market penetration percentages listed in the table for the low-VOC products may actually be higher today. This was evident

when staff compiled Appendix A and several low-VOC products were found in addition to those listed in the Survey for the categories proposed for amendment. Table 1 also lists the number of manufacturers and products for each VOC segment (at or below the proposed limit and above) for each coating category proposed for amendment. The market penetration was calculated based on sales volumes, excluding quart containers or less and low-solids products, provided by the Survey.

Table 1
CA Market Penetration

VOC Range (g/l)	# of Manufacturers	# of Products	Percent of Products	CA Sales Volume(gallons)	% of Sales Volume	Current Limit	Proposed Limit
Bond Breakers							
0-100	PD	1	9%	PD	27%	350	100
>100	5	10	91%	68,896	73%		
Concrete-Curing Compounds							
0-100	10	41	38%	335,591	48%	350	100
>100	19	67	62%	356,694	52%		
Dry-Fog Coatings							
0-100	8	36	40%	153,908	33%	400	100
>100	9	53	60%	305,848	67%		
Fire-Retardant Coatings (Clear)							
0-50	PD	9	100%	PD*	100%	650	50
>50	0	0	0%	PD*	0%		
Fire-Retardant Coatings (Pigmented)							
0-50	6	9	45%	PD*	40%	350	50
>50	4	11	55%	PD*	60%		
Traffic Coatings							
0-100	20	39	34%	139,472	20%	150	100
>100	19	75	66%	550,377	80%		

* PD is protected data, fewer than 3 companies reported sales

PROPOSED AMENDMENTS

AQMD Staff Proposal

Based on this analysis, staff has determined that the coating categories listed in Table 1 warranted further consideration, since they have some of the highest VOC limits of the remaining coating categories.

Based on the approach and data discussed above, staff proposes amending Rule 1113 as follows:

- Amend the definition for floor coatings to include clear floor coatings, except for IM coatings and clear wood finishes. This clarification is necessary to keep the intent of the original definition which included both opaque and clear coatings.

- Add a new definition for nonflat high gloss by separating this category from the general nonflat category.

- Extend the VOC limit effective date for nonflat high gloss coatings from July 1, 2006 to July 1, 2007.

- Modify the definition of VOC to exclude TBAc when used in formulating IM coatings including zinc-rich industrial maintenance coatings.

- Add an exemption for TBAc allowing the solvent to be an exempt compound when used in the formulation of industrial maintenance coatings including zinc-rich primers.

- Remove the requirement to submit an annual report to the Executive Officer for the following specialty coating categories: clear brushing lacquers, rust preventative coatings and special primers. These coatings have or will be subsumed by July 1, 2006 into the lower VOC general coating categories lacquer; nonflat; and primer, sealer, undercoater; respectively.

- Change the VOC limit of 50 g/l for quick-dry enamels to 150 g/l effective July 1, 2006 and implement the limit of 50 g/l effective July 1, 2007.

- Reduce the VOC content limits to 100 g/l for bond breakers, concrete-curing compounds, dry-fog coatings and traffic coatings, and 50 g/l for fire retardant coatings in the Table of Standards in paragraph (c)(2) effective July 1, 2007.

- Update administrative requirements such as outdated labeling requirements for brushing lacquers, technology assessments and acronyms.

TABLE OF STANDARDS
VOC LIMITS
Grams of VOC Per Liter of Coating,
Less Water and Less Exempt Compounds

COATING	Current Limit*	Effective Date 7/1/06	Effective Date 7/1/07
Bond Breakers	350		100
Concrete-Curing Compounds	350		100
Dry-Fog Coatings	400		100
Fire-Retardant Coatings			
Clear	650		50
Pigmented	350		50
Nonflat Coatings	150		50
Quick-Dry Enamels	250	150	50
Traffic Coatings	150		100

NPCA Alternative Proposal

NPCA recommends that Rule 1113 be amended as follows:

1. TBAc should be available for use in IM coatings and for additional use in lacquers and varnishes;

2. Enter into a partnership with AQMD to evaluate the atmospheric availability of Texanol (as well as other VOCs);

3. Develop better comparative tools to be used in technology assessments;

4. Request that the following categories be subdivided into Interior and Exterior classifications. Such a subdivision recognizes the very real differences in performance requirements of interior and exterior exposures. In addition, this will allow the vast majority of Rule 1113's more stringent VOC limits to remain in effect.

   The categories proposed for amendment are as follows, effective 7/1/06:

   a. Non-Flat Coatings (Interior 50 g/L*; Exterior 150 g/L; High Gloss 150 g/L)

   b. Primers, Sealers & Undercoaters (Interior 100 g/L*; Exterior 200 g/L

   c. Quick Dry Primers, Sealer & Undercoaters (Interior 100 g/L*; Exterior 200 g/L)

   d. Quick Dry Enamels (Interior 150 g/L*; Exterior 250 g/L)

   e. Stains (Interior 250 g/L*; Exterior 250 g/L)

   f. Floor Coatings (Interior 50 g/L*; Exterior 100 g/L)

   *** No change proposed to current SCAQMD July 1, 2006 limit.**

5. Flat Coatings should be subdivided into Exterior and Interior and the VOC Limit scheduled to go into effect for Interior Flat Coatings (50 g/L) be moved up 18 months to January 1, 2007 from July 1, 2008 and that the limit for Exterior Flat Coatings continue at 100 g/L.

6. The VOC limit for Water Proof Sealers should be maintained at 250 g/l and the VOC limit for Waterproofing Concrete/Masonry Sealers should be maintained at 400 g/l.

7. Extend the effective date for the new VOC limit for Industrial Maintenance Coatings by one year to July 1, 2007. This extension will provide AQMD staff and industry a period of time to examine how this category can be subdivided without detriment to the infrastructure.

8. The small container exemption for Clear Wood Finishes, Varnishes, Clear and Semi-Transparent, Sanding Sealers and Lacquers including Pigmented Lacquers should be maintained.

Table 2 below summarizes the emission impact of the NPCA proposal. Emission data for NPCA alternative proposal is based on CARB 2001 Architectural Coating Survey and AQMD making up 45% of CA population.

Table 2
Emission Impact of NPCA Alternative Proposal

Categories	AQMD Future Limit (g/l)	AQMD Effective Date	NPCA Limit (g/l)	Emission Reductions Permanently Forgone (tpd)	Emission Reductions Delayed (Gained) (tpd)	NPCA Effective Date
CWF-Small Containers[1]	275	7/1/06	Unlimited	0.91		Open
Flat, Interior[2]	50	7/1/08	50		(1.69)	1/1/2007
Flat, Exterior			100	0.93		Open
Floor, Interior	50	7/1/2006	50			7/1/2006
Floor, Exterior			100	0.02		Open
IM[3]	100	7/1/2006	250		2.44	7/1/2007
Nonflat, Interior	50	7/1/2006	50			7/1/2006
Nonflat, Exterior			150	0.64		Open
Nonflat, HG (I/E)			150	0.46		Open
PSU, Interior	100	7/1/2006	100			7/1/2006
PSU, Exterior			200	0.28		Open
QDE, Interior	50	7/1/2006	150	0.19		7/1/2006
QDE, Exterior			250	0.03		Open
QDPSU, Interior	100	7/1/2006	100			7/1/2006
QDPSU, Exterior			200	0.01		Open
Stains, Exterior (HS)	100	7/1/2007	250	0.57		Open
WPCMS (HS)	100	7/1/2006	400	0.25		Open
WPS (HS)	100	7/1/2006	250	0.26		Open
Net Total Emission Reductions				**4.55 tpd**		

1 Includes Lacquers, Sanding Sealers, and Varnish

2 Gain for 1½ years

3 TBAc exempt for IM coatings, Emissions postponed for 1 year.

EMISSION INVENTORY AND EMISSION REDUCTIONS

California Air Resources Board Surveys

CARB gathers air quality data for the state of California, ensures the quality of this data, designs and implements air models, and sets ambient air quality standards for the state. CARB compiles the state emissions inventory and performs air quality and emissions inventory special studies. CARB uses the emissions inventory and air quality models to evaluate air quality and reduce emissions in each of the 35 local air districts.

CARB has conducted architectural coating surveys every four or five years with previous surveys conducted in 1976, 1981, 1985, 1989, 1993, 1998 and 2000. The purpose of the surveys is to gather current information on the VOC content and sales volume of architectural coatings. CARB is currently evaluating data collected in the latest survey for sales in 2004.

The data from this survey is not currently available, and will be incorporated should it become available in time.

The surveys are used in the development of regulations or rules throughout California to reduce the VOC emissions from these products. CARB has provided technical assistance to the air pollution control districts in the form of industry surveys and research. To track the emission contributions of architectural coatings, an inventory was created that is based on the surveys. CARB has also provided regulatory and policy guidance through the development of a SCM for architectural coatings, which was first adopted in 1977, and subsequently amended in 1985, 1989, and 2000.

The 2001 Survey listed all architectural coatings into 51 coating categories. These 51 categories are integrated by definition into the 42 coating categories in the Rule 1113 Table of Standards. The 2001 Survey identified more than 98 million gallons of architectural coatings sold in California in 2000, with 83 percent of that volume coming from waterborne products and 17 percent from solventborne products. Emissions from these coatings are approximately 40,000 tons of VOC per year or about 110 tons per day as an annual average. Although waterborne products represented 83 percent of the volume, they only contributed 41 percent of these emissions, while the solventborne products representing 17 percent of the volume sold contributed 59 percent. If emissions from solventborne thinning and cleanup products are included (assumed to be one pint per gallon of solventborne coating and zero for waterborne coatings), the average annual emissions are approximately 128 tons per day, with 35 percent of the emissions contributed by waterborne products and 65 percent coming from solventborne products. Information on VOC content was also collected for all 51 coating categories. Coating sales in the AQMD are estimated based on population and represent 45 percent of those sold statewide. It is assumed that the distribution of waterborne and solventborne coatings is consistent throughout the state.

Values for VOC content summarized in the 2001 Survey were determined by calculating the sales-weighted average. The VOC content values appear as VOC Actual (A-VOC) and VOC Regulatory (R-VOC). A-VOC, also know as Material VOC, is a ratio of the weight of volatile organic compounds per a given volume of coating. A-VOC is the value used exclusively to determine the emission inventory. R-VOC is a ratio of the weight of VOCs per a given volume of coating with water and exempt VOCs subtracted from both the numerator (weight) and denominator (volume) and is what appears as the VOC limit in all coating rules. The original rational behind the R-VOC value was to reflect the relationship of coverage to total solids content and to provide an equivalent basis for comparing the polluting portion of solventborne and waterborne coatings. Also, it was believed that the R-VOC approach would prohibit coating manufacturers from simply diluting a coating with water in order to meet standards specified in coating regulations.

Under a Confidentiality Agreement, AQMD has obtained the detailed data submitted by manufacturers to CARB for compilation. The AQMD has signed a confidentiality agreement with CARB agreeing to comply with the provisions of the California Public Records Act (California Government Code Section 6250 et Seq.), and specifically with Government Code Section 6254.5(a), regarding the disclosure of confidential data provided by architectural coating manufacturers in the 2001 Architectural Coatings Survey, which was submitted to CARB under a claim of confidentiality. The AQMD also agreed that, as set forth in California Government Code Section 6254.5(e), the above-referenced information shall only be used for

purposes that are consistent with existing law. Both the emission inventory and the emission reductions are calculated from data provided in the 2001 Survey. However, the emissions inventory is calculated from total sales volume for all container sizes, whereas emission reduction calculations are based on an adjusted emission inventory calculated using an adjusted sales volume omitting quart containers or less, since they are exempt from the current provisions of Rule 1113 and for containers greater than quarts at or below the current VOC limit. The additional processing of the 2001 Survey data yields numbers that may not be available from the published Summary.

Emission Inventory

The California sales volume and emission inventory in Table 3 has been taken from the 2001 Survey. The emission inventory is calculated by multiplying the sales volume by the sales weighted average actual-VOC. The AQMD sales volume and emission inventory is based on demographics taken from the 2000 U.S. Census.. Although the census shows the population of all of Los Angeles, Orange, Riverside and San Bernardino Counties at 46 percent of the California population, staff used a factor of 45 percent to discount the portions of the counties not within AQMD jurisdiction.

Table 3
Emission Inventory for Selected Coating Categories from the 2001 Survey

Coating Category	CA 2000 Sales (gallons)	CA Emissions (tpy)	AQMD 2000 Sales (gallons)	AQMD Emissions (tpy)	AQMD Emissions (tpd)
Bond Breakers	93,896	25.0	42,253	11.25	0.03
Concrete-Curing Compounds	692,419	135.4	311,589	60.93	0.17
Dry-Fog Coatings	459,756	400.3	206,890	180.14	0.49
Fire-Retardant Coatings	PD*	6.2	PD*	2.79	0.008
Nonflat, High Gloss	1,926,436	1,332.1	866,896	599.45	1.64
Quick-Dry Enamels	PD*	909.1	PD*	409.10	1.12
Traffic Coatings	3,338918	1,107.7	1,502,513	498.47	1.37
Totals		1,674.6		753.58	2.068

* PD is protected data, fewer than 3 companies reported sales

Adjusted Emission Inventory for Calculating Emission Reductions

Staff adjusted the 2001 Survey baseline inventory to account for sales of: (a) coatings below the proposed VOC limit which were excluded from the inventory, since these coatings are already compliant; (b) coatings above the current AQMD VOC limits where were assumed to be at the current compliance limit, and (c) small exempt containers.

This establishes different volume fractions of VOC content, solids, and water/exempt solvents used to adjust both sales and the emission inventory. When the VOC content is reduced, it is replaced by water or exempt compounds and this typically lowers the solids content, reflecting a greater sales volume but usually an overall emission reduction. The adjusted sales volume and emission inventory are used to calculate projected sales and emission inventory at the proposed VOC limit established through technology assessment and data from the 2001 Survey.

The detailed emission inventory calculations may be found in Appendix B. Table 4 summarizes the 2000 adjusted emissions inventory for both California and the AQMD based on the elements previously stated, and with the assumption that 45 percent of the state sales are within the AQMD jurisdiction.

Table 4
2000 CA and AQMD Adjusted Emission Inventory

Coating Category Proposed VOC g/l	California Adjusted		AQMD Adjusted	
	Sales	Emission Inventory	Emission Inventory	
	Gallons	tpy	tpy	tpd
Bond Breakers-100	67,308	22.56	10.15	0.03
Concrete-Curing Compounds-100	359,428	112.56	50.65	0.14
Dry-Fog Coatings-100	305,557	385.19	173.33	0.47
Fire-Retardant Coatings-50	PD*	5.33	2.40	0.01
Nonflat, High Gloss-150	1,961,924	549.22	247.15	0.68
Quick-Dry Enamel-150	932,806	439.06	197.58	0.54
Quick-Dry Enamel-50	828,113	234.60	105.58	0.29
Traffic coatings-100	2,249,225	838.65	838.65	1.03
Totals		1,364.28	613.93	1.68

* PD is protected data, fewer than 3 companies reported sales

Emission Reductions For Coating Categories Proposed For Amendment

The emission reductions are calculated by subtracting the projected emission inventory from the adjusted emission inventory.

The proposed amendments will achieve an overall VOC emission reduction of 0.81 tons per day from bond breakers, concrete-curing compounds, dry-fog coatings, fire-retardant coatings and traffic coatings beginning July 1, 2007. The VOC emission reductions postponed for one year from the nonflat, high gloss category will be 0.48 tons per day and from the quick-dry enamel category, 0.20 tons per day. The postponed VOC emission reductions will be regained beginning July 1, 2007. Table 5 summarizes the AQMD VOC emission reductions from PAR Rule 1113.

Table 5
Summary of AQMD Emission Reductions

Coating Category	Proposed VOC Limit (g/l)	Emissions Reductions Postponed (tpd)	Additional Emission Reductions (tpd) July 1, 2007
Bond Breakers	100		0.02
Concrete-Curing Compounds	100		0.09
Dry-Fog Coatings	100		0.40
Fire-Retardant Coatings	50		0.01
Nonflat, High Gloss Coatings*	50	0.48	
Quick-Dry Enamel*	150/50	0.20	
Traffic Coatings	100		0.29
Total		**0.68**	**0.81**

* The emission reductions from these categories have been accounted for in prior rule amendments.

COST AND COST-EFFECTIVENESS

The data compiled in Appendix A, which summarizes technical data of the many products already being manufactured and sold in today's consumer market for the categories proposed for amendment clearly demonstrate that the proposed VOC limits are not technology forcing, but technically feasible and cost-effective. In order to obtain relevant pricing to determine cost-effectiveness of the proposed amendments, staff contacted architectural coating manufacturers to obtain the cost per gallon for products that comply with the current VOC limits, as well as the proposed VOC limits. Appendix A shows the average cost per gallon obtained from the manufacturers or distributors. Staff continues to receive data and will update the appendix accordingly.

All sales volumes are reflected as adjusted 2001 Survey values based on current AQMD VOC limits. Furthermore, these adjusted volumes are translated into future gallons as a ratio between the solids content of the current adjusted inventory and the future solids content. This cost is then multiplied by the number of gallons sold.

The annual cost increase is derived as the difference between the projected cost of future coatings and the cost of the current coatings. Since the emission inventory is stated in terms of daily emissions or tpd, the emission reduction for all the coating categories is converted to a yearly figure by multiplying by 365 operating days per year. The cost-effectiveness in dollars per ton is calculated by dividing the annual cost increase by emission reductions in tons per year (tpy) and is represented by the following equation. Table 6 itemizes these costs.

$$\textit{Cost-Effectiveness} = \frac{\textit{Annual Cost Increase}}{\textit{Emission Reductions in tpy}}$$

Table 6
Cost Based on the Current Sales Price

Coating Categories with Proposed VOC Limit	Current Costs			Future Costs		
	Average Cost Per Gallon[1]	AQMD 2000 Sales Volume[2] (gallons)	Dollars	Average Cost Per Gallon[3]	AQMD Projected Sales Volume[4] (gallons)	Dollars
Bond Breakers 100 g/l	$13.63	30,289	$412,839	$13.63	20,281	$276,430
Concrete-Curing Compounds 100 g/l	$5.80	161,743	$938,845	$5.84	157,492	$920,203
Dry-Fog Coatings 100 g/l	$20.79	137,501	$2,858,073	$18.77	142,741	$2,679,688
Fire-Retardant Coatings 50 g/l	$59.61	PD	$460,249	$61.76	PD	$411,322
Traffic Coatings 100 g/l	$23.76	1,012,151	$24,047,744	$23.76	998,981	$23,734,837
Totals		1,349,405	$28,717,749		1,326,155	$28,022,480

[1] Average cost per gallon for products with prices listed in Appendix A.
[2] AQMD adjusted 2000 sales volume based on current VOC limit per Appendix B.
[3] Average cost per gallon for products with prices listed in Appendix A, at or below the proposed VOC limit.
[4] AQMD projected sales volume based on the proposed VOC limit per Appendix B.

Annual Cost Increase = $28,022,480 – $28,717,749 = $(695,269)
Emission Reductions = 0.81 tpd * 365 days per year = 296 tpy

Because there are no annual cost increases anticipated, implementation of PAR 1113 will actually result in savings.

SOCIOECONOMIC ASSESSMENT

A socioeconomic analysis of the amendments to Rule 1113 will be performed. The socioeconomic impacts associated with the CEQA alternatives (if any) will also be analyzed. The socioeconomic report will be released no later than 30 days prior to the Board hearing.

COMPARATIVE ANALYSIS OF ARCHITECTURAL COATING RULES

	Rule 1113 – Architectural Coatings	**40 CFR, Subpart D – National Volatile Organic Compound Emission Standards for Architectural Coatings**
Applicability	Any person who supplies, sells, offers for sale, or manufactures architectural coatings to be field applied to stationary structures or their appurtenances, and to mobile homes, pavements or curbs as well as any person who applies or solicits the application of architectural coatings in the District.	Each architectural coating manufactured on or after September 13, 1999 for sale or distribution in the U.S., except architectural coatings registered under the Federal Insecticide, Fungicide, and Rodenticide Act manufactured on or after March 13, 2000 for sale or distribution in the U.S.
Definition Modifications	Floor Coatings – to include clear coatings except for industrial maintenance and clear wood floor coatings. Nonflat High Gloss – register 70 or above on a 60 degree meter. Volatile Organic Compound – excludes TBAc as a VOC for industrial maintenance coatings.	Floor Coatings – means an opaque coating Nonflat Coatings – includes all sheens Volatile Organic Compound – conditional exclusion for TBAc.
VOC Content Limits	250 g/l or VOC limits specified in the Table of Standards on specified effective dates.	VOC content not to exceed applicable limit in Table 1 to Subpart D.
Coatings Proposed for specified lower VOC limits in AQMD	Bond Breakers – 100 Concrete-Curing Compounds – 100 Dry-Fog Coatings – 100 Fire-Retardant Coatings – 50 Traffic Coatings - 100	Bond Breakers – 600 Concrete-Curing Compounds – 350 Dry-Fog Coatings – 400 Fire-Retardant Coatings – 850 Clear 450 Opaque Traffic Coatings - 150
Most Restrictive VOC Limit	Lowest VOC limit applies if a coating label or literature implies that the coating may fall into two or more categories. 5 exemptions.	Lowest VOC limit applies if a coating label or literature implies that the coating may fall into two or more categories. 17 exemptions.
Sell-Through Provision	If manufactured prior to effective date of applicable VOC limit in Table, 3-year sell-through including application.	None

	Rule 1113 – Architectural Coatings	40 CFR, Subpart D – National Volatile Organic Compound Emission Standards for Architectural Coatings
Compliance Options	An annual averaging program that allows coatings to be sold with a VOC content greater than the applicable limit, that are offset with a greater volume of sales with a VOC content below the applicable limit. Emissions must be at or below levels as if all sales were compliant. Appendix A - Requirements for Averaging Provision.	Exceedance fees for manufacturers of coatings above the applicable VOC limit. Tonnage exemption if VOC contained in coatings selected for exemption is equal to or less than 10 tons per year. No Averaging Provisions Requirements.
Container Labeling Requirements	Date of Manufacture or code that displays the date of manufacture. Thinning recommendations, does not include thinning with water. Coating VOC content as supplied and after manufacturers recommended thinning. Coating VOC content and Material VOC content for low-solids coatings. Special labeling for quick-dry primers, sealers and undercoaters, quick-dry enamels, rust preventative coatings and specialty primers.	Date of Manufacture or code that displays the date of manufacture. Thinning recommendations, does not include thinning with water. Coating VOC content as supplied and after manufacturers recommended thinning. Material VOC content for low-solids coatings. Special labeling for industrial maintenance coatings and recycled coatings.
Reporting Requirements:	Averaging Compliance Option recordkeeping and reporting. Annual reports for sales in gallons of recycled coatings. Recycled paint manufacturers must submit a letter certifying they are manufacturers of recycled coatings.	Recycled coatings records. Exceedance fee records. Tonnage exemption records. Initial notification report from each manufacturer and importer of any architectural coating.
Test Methods	Determination of VOC content: U.S. EPA Reference Test Method 24 and for exempt compounds by SCAQMD Method 303 or SCAQMD Method 304. Acid Content of Coatings: ASTM Test Method D 1613-85. Metal Content of Coatings: SCAQMD Method 311. Flame Spread Index: ASTM Test Method E 84-99. Drying Times and Tack–Free Time: ASTM Test Method D 1640 and ASTM Test Method D 1640 (Mechanical Test Method) respectively. Gloss Determination: ASTM Test Method D 523. Equivalent Test Methods: Other test methods determined to be equivalent by the staffs of the District, the California Air Resources Board, and the U.S. EPA, and approved in writing by the District Executive Officer may also be used.	Determination of VOC content: U.S. EPA Reference Test Method 24 (Method 24 prevails). Formulation data, or any other reasonable means for predicting that the coating has been formulated as intended (e.g., quality assurance checks, recordkeeping. Alternative Methods: The Administrator may approve, on a case-by-case basis, a manufacturer's or importer's use of an alternative method in lieu of Method 24 for determining the VOC content of coatings if the alternative method is demonstrated to the Administrator's satisfaction to provide results that are acceptable for purposes of determining compliance with this subpart.

	Rule 1113 – Architectural Coatings	40 CFR, Subpart D – National Volatile Organic Compound Emission Standards for Architectural Coatings
Technology Assessments	For future VOC limit for flat coatings	None
Exemptions	Containers of one quart or less. Clear wood finish quart container exemption will be phased out in 2006. Coatings manufactured for sale outside AQMD jurisdiction. Emulsion type bituminous pavement sealers. Aerosol coating products. High altitude use of stains/lacquers above 4,000 feet. Thinning to avoid blushing with humidity above 70% and temperature below 65 degrees F at certain times of the year and with a maximum VOC content if the coating contains acetone. Extended VOC limits for Small Businesses meeting specific criteria. Research and development test specimens.	A coating that is manufactured for sale or distribution to architectural coating markets outside the United States; such a coating must not be sold or distributed within the United States as an architectural coating. A coating manufactured prior to September 13, 1999. A coating that is sold in a non-refillable aerosol container. A coating that is collected and redistributed at a paint exchange. A coating that is sold in a container with a volume of one liter or less.

DRAFT FINDINGS UNDER CALIFORNIA HEALTH AND SAFETY CODE

Health and Safety Code Section 40727 requires that prior to adopting, amending or repealing a rule or regulation, the AQMD Governing Board shall make findings of necessity, authority, clarity, consistency, non-duplication, and reference based on relevant information presented at the hearing. The draft findings are as follows:

Necessity - The AQMD Governing Board has determined that a need exists to amend Rule 1113 - Architectural Coatings to exempt the solvent TBAc on a limited basis for IM coatings to meet the 100 g/l limit and to have one additional year for manufacturers to formulate both nonflat high gloss coatings and quick-dry enamels to meet the VOC limit of 50 g/l. In addition, the proposed amendments will lower the VOC limit for the following five coating categories: bond breakers, concrete-curing compounds, dry-fog coatings, fire-retardant coatings, and traffic coatings by July 1, 2007.

Authority - The AQMD Governing Board obtains its authority to adopt, amend, or repeal rules and regulations from Health and Safety Code Sections 39002, 40000, 40001, 40440, 40702, and 41508.

Clarity - The AQMD Governing Board has determined that the proposed amendments to Rule 1113 - Architectural Coatings, are written and displayed so that the meaning can be easily understood by persons directly affected by them.

Consistency - The AQMD Governing Board has determined that PAR 1113 - Architectural Coatings, is in harmony with, and not in conflict with or contradictory to, existing statutes, court decisions, federal or state regulations.

Non-Duplication - The AQMD Governing Board has determined that the proposed amendments to Rule 1113, do not impose the same requirement as any existing state or federal regulation, and the proposed amendments are necessary and proper to execute the powers and duties granted to, and imposed upon, the AQMD.

Reference - In adopting these amendments, the AQMD Governing Board references the following statutes which the AQMD hereby implements, interprets or makes specific: Health and Safety Code Sections 40001 (rules to achieve ambient air quality standards), 40440(a) (rules to carry out the Air Quality Management Plan), and 40440(c) (cost-effectiveness), 40725 through 40728 and Federal Clean Air Act Sections 171 et sq., 181 et seq., and 116.

CONCLUSION AND RECOMMENDATION

After working with architectural coating manufacturers, resin manufacturers, the NPCA, and other interested parties to resolve their concerns, staff agrees that the revisions are necessary and recommend adoption of the proposed amendments to Rule 1113.

REFERENCES

2001 Architectural Coatings Survey, Final Report, California Air Resources Board, October, 2003.

Technical data sheets and material safety data sheets provided by Architectural Coating Manufacturers.

Annual Status Report on Rule 1113 – Architectural Coatings. SCAQMD, December 2003.

Final report for SCAQMD project, "Environmental Chamber Studies of VOC Species in Architectural Coatings and Mobile Source Emissions," dated July 5, 2005.